November 2017

HKEX 香港交易所

RESEARCH REPORT

OTC CLEARING SOLUTION FOR MAINLAND CHINA'S INCREASING CROSS-BORDER DERIVATIVES TRADING

CONTENTS

Chief China Economist's Office
Hong Kong Exchanges and Clearing Limited

14 November 2017

SUMMARY

In the course of Mainland China's market economy reforms, **there has been increasing trading activities in over-the-counter (OTC) derivatives by Mainland financial institutions for risk management purposes**. Domestically, trading value in interest rate swaps on the interbank market surged as they are increasingly used for hedging against the increased volatility in interest rates along with the market-based interest rate reform. Rapid growth was also seen in the trading of foreign exchange (FX) derivatives on the domestic interbank market, which are used for hedging the increasing FX risk along with the market-based FX rate reform.

Alongside, Mainland financial institutions are increasingly engaged in international businesses with overseas parties in the course of China's market opening and economic development. As a result of providing the funding needs for international trade, infrastructure projects under the One-Belt-One-Road strategy and Mainland enterprises' international business developments, Mainland financial institutions would have an increasing proportion of their balance sheet in foreign currency, the majority of which would be US dollar, the mostly used global currency in international trade and finance. Interest income in foreign currency assets is susceptible to interest rate risk as well as to FX rate risk. Therefore, **in addition to the increasing utilisation of risk management instruments in the domestic OTC market, there is also an increasing demand by Mainland financial institutions for hedging their growing foreign asset positions by engaging in OTC interest rate and FX derivatives transactions with foreign institutions.**

Under the tightened global regulatory framework for risk management of OTC derivatives after the 2008 Global Financial Crisis, financial institutions would either have to do mandatory central clearing for standardised OTC derivatives or to be subject to higher capital and margin requirements for bilaterally cleared OTC derivatives. In the latter case, they may voluntarily opt for central clearing in order to reduce the transaction costs. International participants domiciled in Europe or the US generally use major clearing houses recognised by their home regulators, such as LCH or Eurex Clearing in Europe, or CME Clearing in the US. Mainland banks which execute OTC derivatives transactions with foreign institutions would have to centrally clear the trades via a recognised central counterparty (CCP). Very often, Mainland banks would not be able to become direct clearing members of the foreign CCPs owing to the uncertainty in the status of the People's Republic of China (PRC) as a netting jurisdiction. As a result, clearing and settlement is usually done via a clearing broker which is a clearing member of an overseas CCP and which acts as the agent for the Mainland banks.

In the Asian time zone, the subsidiary of Hong Kong Exchanges and Clearing Ltd (HKEX) — OTC Clearing Hong Kong Ltd (HKEX OTC Clear) — is a recognised clearing house for OTC derivatives in Hong Kong and is also a qualified central counterparty for US and European institutions to treat risk exposure facing CCP under preferential capital treatment. It is also the only overseas CCP that can accept PRC banks with a Hong Kong branch to be direct clearing members. This practice is unparalleled in the US and European clearing houses. Given that many of the Mainland banks have set up branches or subsidiaries in Hong Kong, becoming a direct member of HKEX OTC Clear would be more cost-effective than appointing a clearing broker for clearing their derivatives transactions in an overseas CCP. Under the solution offered by HKEX OTC Clear, the Mainland banks can do direct clearing via their Hong Kong subsidiaries or branches. Hence, **compared to other clearing houses, HKEX OTC Clear offers a more convenient and cost-effective solution to Mainland banks for central clearing of their OTC derivatives transactions**. Moreover, in addition to serving OTC transactions in USD and other major currencies, **HKEX OTC Clear is more capable, compared to its overseas counterparts, to support Mainland and global financial institutions' OTC transactions in offshore RMB**, which are believed to have a high growth potential.

1. THE INCREASING OTC DERIVATIVES ACTIVITIES OF MAINLAND FINANCIAL INSTITUTIONS

Over-the-counter (OTC) derivatives were introduced in Mainland China only a little more than a decade ago. There are virtually no OTC derivatives markets other than the one operated by the **China Foreign Exchange Trade System (CFETS)** which is under the supervision of the People's Bank of China (PBOC) and the State Administration of Foreign Exchange (SAFE). The first derivative product introduced on CFETS was bond forwards in June 2005. The product range is now extended to include foreign exchange (FX), interest rate and credit derivatives.

1.1 CFETS and its products

CFETS, also known as the National Interbank Funding Center, is a sub-institution (直屬事業單位) of the PBOC established on 18 April 1994. Its main functions are to provide services for interbank FX trading, Renminbi (RMB) borrowing and lending, trading in bonds (including commercial papers) and derivatives, and the associated clearing, information, risk management and supervision services.

In the money market, CFETS operates the FX market and the RMB market. In the FX market, CFETS is responsible for calculating and disseminating the central rates of the RMB against major currencies including the US dollar (USD), the Euro (EUR), Japanese yen (JPY), British pound (GBP) and Hong Kong dollar (HKD). The RMB market consists of the interbank borrowing and lending market, certificates of deposit, loan transfers, the bond market (including asset-backed securities) and the RMB derivatives market.

The first derivative product formally launched in the interbank market was **bond forwards** in June 2005, nine years after the establishment of the interbank bond market in 1996 and the introduction of treasury bond repos in the same year. Given the acceleration of the market-based interest rate reform, Mainland financial institutions were exposed to increased interest rate risk but were facing increasing difficulties in hedging that risk through existing tools like bond repos and forwards. To provide more interest rate risk management tools, **RMB interest rate swaps (IRS)** were introduced in the interbank bond market on a pilot basis in February 2006. Under the pilot, certain qualified institutions were allowed to conduct RMB IRS within certain limits. The pilot programme ended in a full launch of the product in February 2008. Adding to the suite of hedging and risk management tools, **RMB forward rate agreements (FRA)** were introduced In November 2007, followed by **standardised interest rate derivatives**[1] in November 2014, and credit risk mitigation (CRM) instruments, including **CRM warranty (CRMW)** in 2010 and **credit default swaps (CDS)** in September 2016.

In the interbank FX market, **currency forwards** (RMB against foreign currencies) were introduced in August 2005. **Currency swaps** (RMB against foreign currencies) were introduced as a pilot in April 2006[2] and formally in August 2007 upon release of the related rules. **Currency options** were subsequently introduced in April 2011, followed by **standardised currency swaps** in February 2015 and **standardised currency forwards** in May 2016. These products provide the hedging tools for banks, allowing banks greater flexibility in managing their foreign currency positions.

Participants in CFETS include banks and non-bank financial institutions such as securities companies, insurance companies, trust investment companies, funds and fund management companies, asset management companies and social security funds. The interbank bond market was the first in the interbank market to open to foreign participation (in 2010) — initial

1 Standardised interest rate derivatives are IRS and FRA products with standardised expiry and interest duration.

2 RMB swaps against foreign currencies between banks and their customers were introduced earlier in August 2005.

qualified participants included central bank-type institutions, RMB clearing banks and participating banks, Qualified Foreign Institutional Investors (QFIIs) and Renminbi QFIIs (RQFIIs). Authorised foreign participants were later expanded to include all legitimately registered financial institutions and their investment products, pension funds and charity funds. Along with subsequent policy relaxations, certain foreign institutional investors including central bank-type institutions, international financial institutions and sovereign funds can now access a wide range of products on the interbank market, including the spot bond and FX market, bond derivatives and interest rate derivatives.

Clearing and settlement services for OTC derivatives transactions on CFETS are provided by three institutions — CFETS itself, the China Central Depository & Clearing Co., Ltd. (CCDC) and the Shanghai Clearing House (SCH). CFETS provides trade confirmation and straight-through processing (STP) to support the clearing and settlement of transactions in its FX market and RMB market via the PBOC's payment and settlement system. It also provides trade offsetting/compression services for IRS and FX swaps. CCDC provides clearing and settlement services for bond and bond derivatives transactions on CFETS. SCH provides central clearing services for a variety of derivatives transactions. In particular, it was designated by the PBOC in February 2014 to be the central counterparty (CCP) for mandatory central clearing of RMB IRS traded on CFETS[3].

1.2 Derivatives trading activities in the domestic OTC market

As shown in Figure 1, IRS has dominated the trading in bond/interest rate derivatives since 2010. Trading in bond forwards diminished after 2009 and was almost completely taken over by trading in IRS. The trading value of IRS reached RMB 9,920 billion (~US$1.4 trillion) in 2016, with a compound annual growth rate (CAGR) of 76% during the period from 2006 to 2016. However, the trading level is still low in comparison with major international markets — the average daily turnover value in OTC single currency interest rate derivatives in China was about US$4 billion in April 2016, which was 0.3% as much as the daily average of US$1,241 billion in the US and US$1,180 billion in the UK[4]. In terms of currency kind, the OTC single currency interest rate derivatives in RMB had an average daily trading value of US$10 billion in April 2016, which was about 0.7% that in USD, 1.6% that in EUR and 4% that in GBP[5].

As for FX derivatives, RMB/FX swaps (including cross currency swaps)[6] are the dominant product type in terms of trading in nominal principal amount. They reached a total trading value of US$10 trillion in 2016, with a CAGR of 121% during 2006 to 2016 (see Figure 2). In comparison with major international markets, the average daily turnover of OTC FX derivatives (forwards, swaps and options) in RMB was US$134 billion in April 2016, which was about 4% that in USD, 12% in EUR, 19% that in JPY and 30% in GBP[7].

3 PBOC announcement "中國人民銀行關於建立場外金融衍生產品集中清算機制及開展人民幣利率互換集中清算業務有關事宜的通知", 21 February 2014.

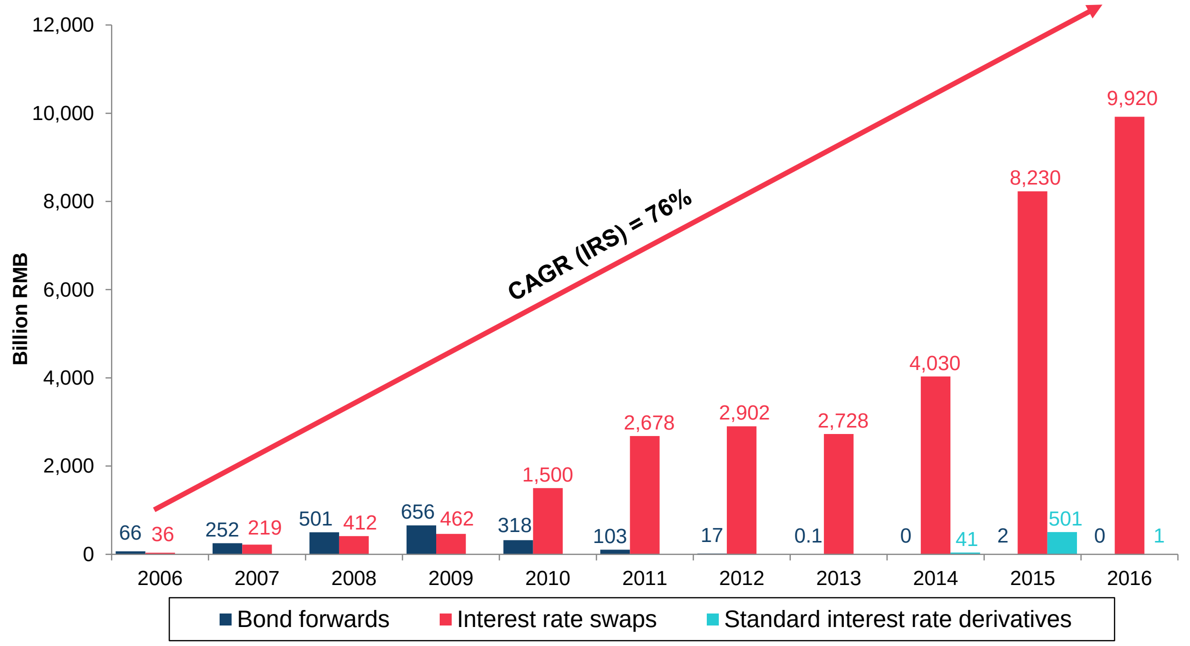
4 Source: Bank for International Settlements (BIS) Triennial Survey statistics on OTC derivatives (April 2016), BIS website; daily averages are on "net-gross" basis.

5 The average daily turnover of OTC single currency interest rate derivatives in USD, EUR and GBP was respectively US$1,357 billion, US$641 billion and US$237 billion in April 2016, on "net-net" basis. Source: BIS Triennial Survey statistics on OTC derivatives (April 2016), BIS website.

6 RMB/FX swap involves the actual exchange of two currencies (RMB against FX) on a specific date at a rate agreed in the contract, and a reverse exchange of the same currencies on a specific date further in the future at another rate. RMB/FX cross currency swap involves the exchange of interest payments in two currencies (RMB and FX) for an agreed period of time and may involve also the exchange of principal amounts of the two currencies at a pre-agreed exchange rate at an agreed time in the future.

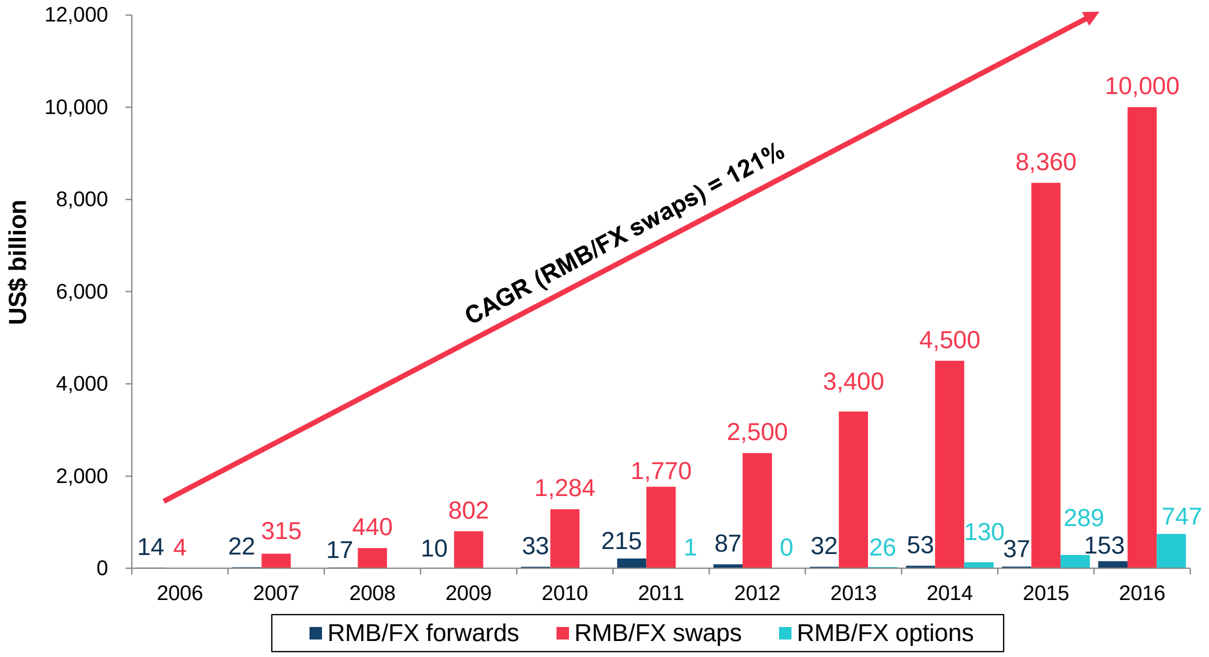
7 The average daily turnover in OTC FX derivatives in USD, EUR, JPY and GBP in April 2016 were respectively US$3,053 billion, US$1,072 billion, US$701 billion and US$438 billion. Source: BIS Triennial Survey statistics on OTC derivatives (April 2016), BIS website; daily averages are on "net-net" basis.

Figure 1. Annual turnover value of bond and interest rate derivatives (2006 – 2016)



Source: PBOC Annual Reports 2006-2016.

Figure 2. Annual turnover value of RMB/FX derivatives (2006 – 2016)



Note: Interbank transactions only, excluding transactions between banks and their clients.

Source: PBOC Annual Reports 2006-2016.

With the rapid growth in FX derivatives trading, especially in RMB/FX swaps instruments, the trading value of FX derivatives has exceeded that in the FX spot market — total FX derivatives trading in 2016 was 1.3 times the trading in the FX spot market (see Table 1).

Table 1. RMB/FX market trading value (2016)			
(US$ trillion)	Bank-Client	Interbank	Total
Overall RMB/FX market	**3.4**	**16.8**	**20.3**
Spot FX	2.9	5.9	8.8
FX derivatives	0.5	10.9	11.5
RMB/FX Forward	0.2	0.2	0.4
RMB/FX swaps & cross-currency swaps	0.1	10.0	10.1
RMB/FX options	0.2	0.7	1.0

Note: Numbers may not add up to total due to rounding.

Source: PBOC Annual Report 2016.

Apart from the specified derivative products for trading on the regulated OTC market on CFETS, there would also be interbank trading of other OTC derivatives pursuant to the business needs of the banks. Same as the case in markets around the world, these OTC derivatives would be products created by the buyer/seller to meet their specific needs with customised terms, bilateral trading and settlement. For example, **banks in the Mainland which have corporate clients doing business with foreign partners may need currency or interest rate hedging tools in foreign currencies like USD**. However, no official statistics are available for these trading activities.

1.3 Big growth potential in Mainland OTC derivatives trading

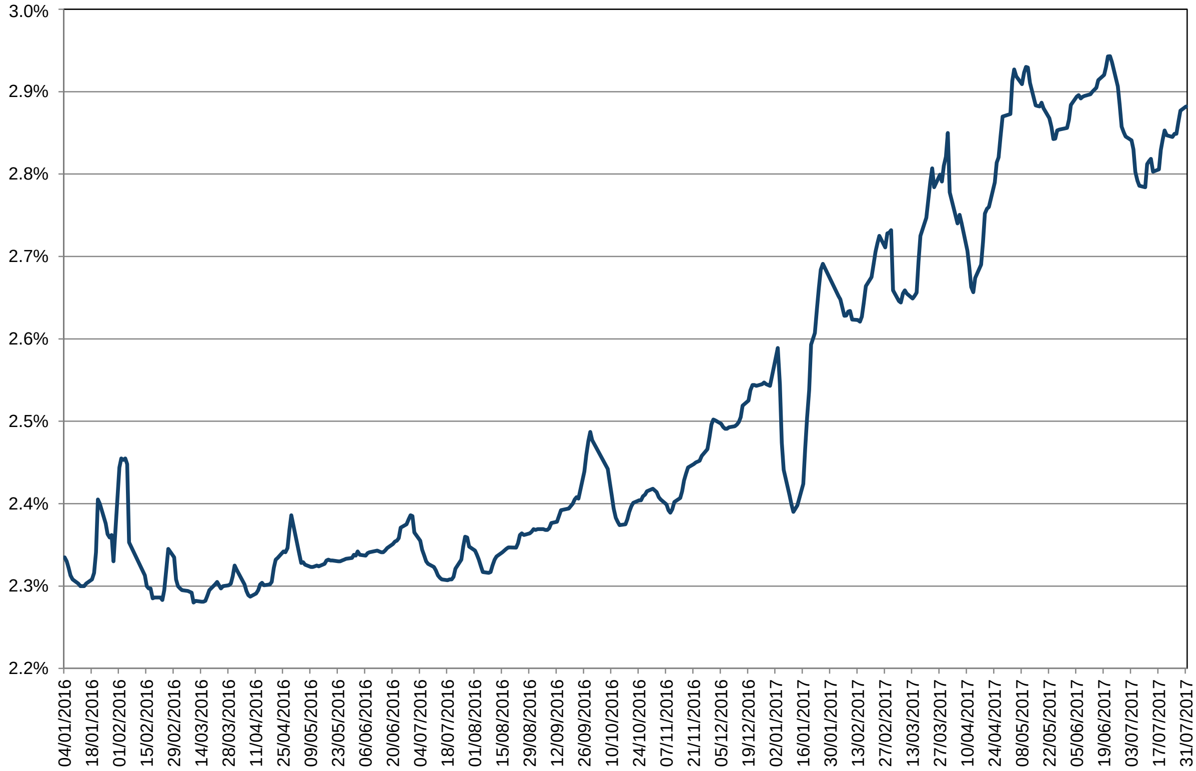
The rapid growth in the trading of IRS could be attributed to the continuous efforts of market-based interest rate reform in the Mainland in the past decade. Along with market economy reform, certain moves of interest rate liberalisation began in early 2000s. The floating range of lending rates were relaxed in January 2004 and was further broadened in October 2004 along with allowing financial institutions to lower the RMB deposit rates below the benchmark rates. Market-based interest rate reform was ascertained by the State Council Standing Committee in June 2013 to be a key financial policy to support economic restructuring. On 24 September 2013, the Market Interest Rate Pricing Mechanism was established as a self-regulatory and coordinative mechanism among financial institutions in the Mainland. It is responsible for self-regulatory management of interest rates in the financial market in accordance with the state's related regulations on interest rates.

In March 2014, the China (Shanghai) Pilot Free Trade Zone became the pioneer in implementing fully market-based foreign currency deposit interest rates in the Mainland. The deposit insurance regulation, which became effective on 1 May 2015, helps pave the way towards full liberalisation of interest rates in the Mainland. The launch of negotiable certificate of deposit (NCD)[8] in June 2016, of which the interest rates are market-driven, signified a further step towards full liberalisation of interest rates.

Market-driven interest rates mean that the borrowing and lending interest rates will fluctuate in consideration of changes in market and economic conditions. **In the light of increasing volatility in interest rates, financial institutions would have increasing demand for interest rate hedging tools such as IRS in the OTC market.** The RMB IRS traded on the interbank market mainly use 7-day repurchase (repo) fixing rate and the Shanghai Interbank Offer Rate (SHIBOR) as the reference rate for the floating end. Figure 3 shows the daily movements of the 1-week SHIBOR, which exhibited a fluctuating rising trend during January 2016 to July 2017.

[8] NCDs are RMB-denominated book-entry form of deposit instruments issued by banks to investors who are non-financial institutions.

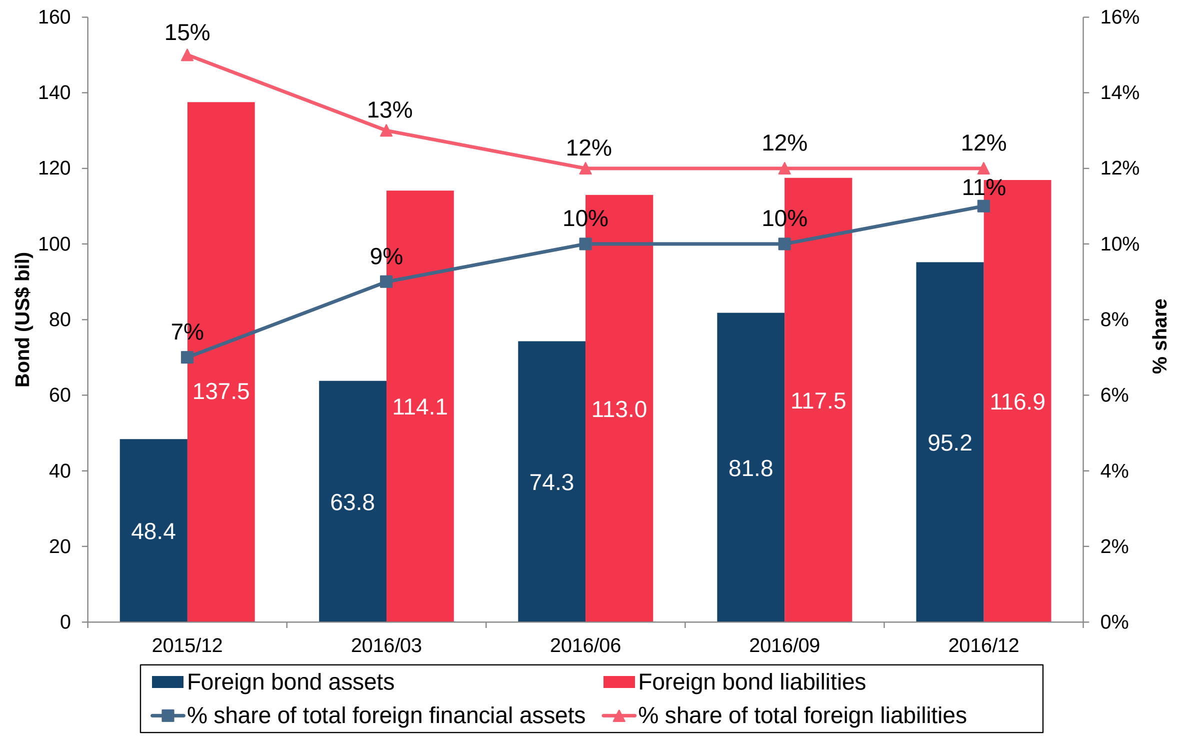
Figure 3. Daily movements of 1-week SHIBOR (4 Jan 2006 – 31 Jul 2017)



Source: SHIBOR website (http://www.shibor.org).

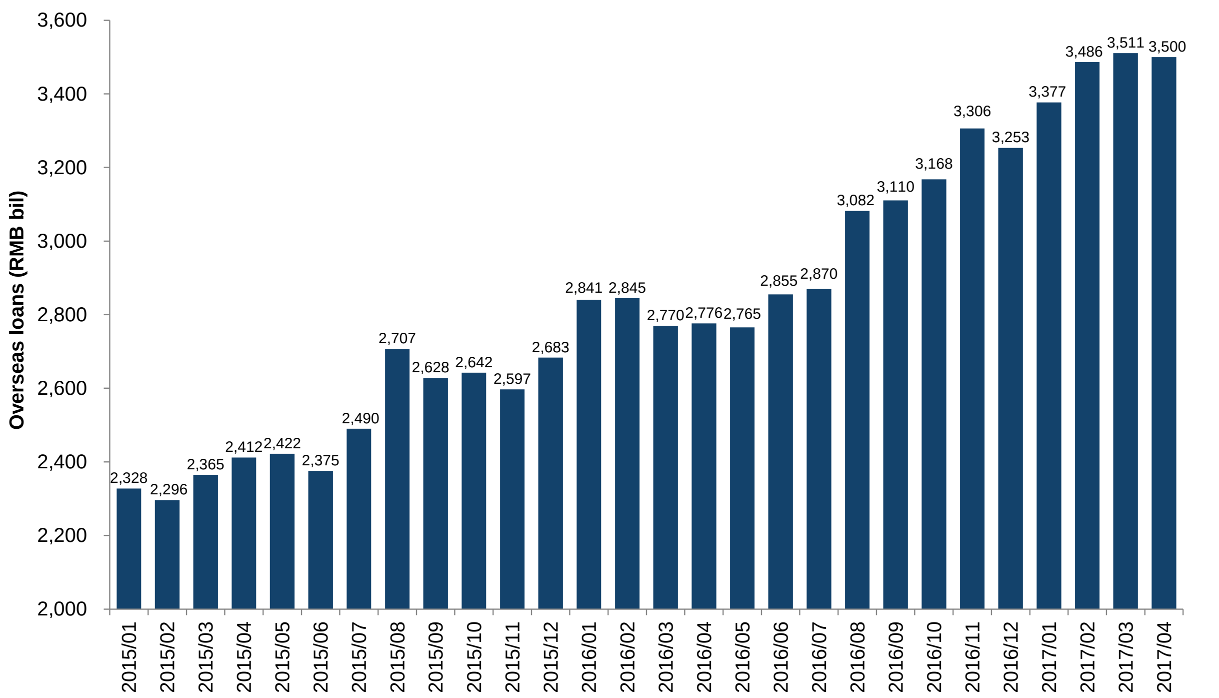
In addition to domestic RMB borrowing and lending activities that would require RMB interest rate risk management, there are increasing overseas financial activities carried out in foreign currencies by Mainland financial institutions. Firstly, along with interest rate liberalisation, the Mainland economy is also increasingly opened resulting in more and more business and financial activities with the world. As a result, **Mainland financial institutions are increasingly engaged in international businesses with overseas parties**, resulting in increasing foreign assets and liabilities. Statistics from SAFE showed that foreign bond assets of Mainland banks (excluding the Central Bank, i.e. the PBOC) had almost doubled from US$48.4 billion at the end of 2015 in a year's time to US$95.2 billion at the end of 2016, rising from 7% to 11% of total foreign financial assets (see Figure 4). Data from the PBOC showed that overseas loans of Mainland financial institutions increased by 50% from RMB 2,328 billion (~US$371 billion) in January 2015 to RMB 3,500 billion (~US$507 billion) in April 2017 (see Figure 5).

Figure 4. Foreign bond assets and liabilities of Mainland banks (excluding Central Bank) (Dec 2015 – Dec 2016)



Source: SAFE data from Wind.

Figure 5. Overseas loans of Mainland financial institutions (Jan 2015 – Apr 2017)



Source: PBOC website.

Secondly, given China's **One-Belt-One-Road (OBOR) strategy**[9] put forward by the Chinese leaders in 2013, there will be substantial infrastructure projects to be run along the OBOR countries and China is expected to play a significant role in funding these projects. According to an estimate made by PwC, total new announced project value along the OBOR countries rose 2.1% in 2016 year-on-year to roughly US$400 billion; the final value could rise by as much as 10%[10]. According to a report by the Asian Development Bank (ADB)[11], developing Asia will need to invest US$26 trillion in total or US$1.7 trillion per year in infrastructure until 2030 to maintain its growth momentum, tackle poverty and respond to climate change (or US$1.5 trillion without climate change mitigation and adaptation costs). The infrastructure investment gap — the difference between investment needs and current investment levels — was estimated to be 2.4% of projected gross domestic products (GDP) for the 5-year period from 2016 to 2020. ADB expected the gap could be bridged to 40% by fiscal reforms and 60% by the private sector.

Mainland financial institutions including policy banks and commercial banks, together with specialised investment funds[12] and multilateral financial institutions promoted by China[13] would play a role in funding the OBOR projects. In 2016, China had a trade volume with OBOR countries of about US$953.59 billion and a total project contract value of about US$126.03 billion[14]. Funding means for OBOR projects include preferential loans, bank syndicate loans, exports credit insurance, industry funds, bond investments, entrusted asset management, equity holdings, etc.

Thirdly, the Mainland government has been encouraging the "going-out" of domestic enterprises as part of its enterprise reform, especially for the state-owned enterprises. **Enterprises' international business development** including mergers and acquisitions (M&A) is therefore a key development direction. **Mainland banks would provide funding to these enterprises in foreign currencies by means of bond issuance.**

As a result of the above funding needs for international trade, OBOR infrastructure projects and enterprise international business developments, Mainland financial institutions would have an increasing proportion of their balance sheet in foreign currencies, the majority of which would be USD, the mostly used global currency in international trade and finance. **Interest income in foreign currency assets is susceptible to interest rate risk as well as to FX rate risk.** The latter has become more prominent after the exchange rate system reform in August 2015 as a result of which the formation mechanism of the central parity rate of RMB against USD in the interbank FX market has become more market-driven. Figure 6 shows the increased volatility of the offshore RMB (CNH) to USD exchange rate (USD/CNH rate) after the reform.

---

9 OBOR consists of the Silk Road Economic Belt (SREB) and 21st Century Maritime Silk Road (MSR) initiatives. The SREB runs through Central Asia, West Asia, the Middle East to Europe, with extension to South Asia and Southeast Asia. The MSR runs through Southeast Asia, Oceania and North Africa. The report, *"Industrial cooperation between countries along the Belt and Road"* (「一帶一路」沿線國家產業合作報告), released by the China International Trade Institute in August 2015 identified 65 countries along OBOR that will be participating in the initiative.

10 "China and Belt & Road Infrastructure, 2016 review and outlook", PwC, February 2017.

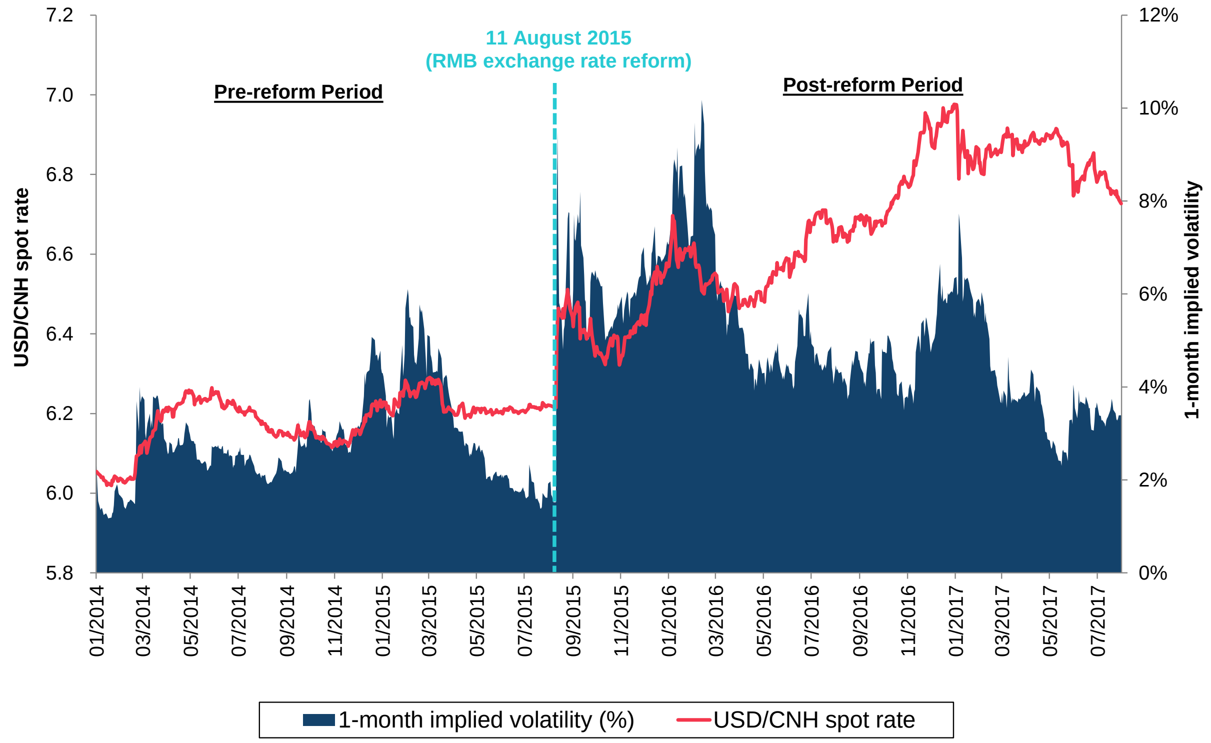
11 "Meeting Asia's infrastructure needs", ADB, February 2017.

12 Including the Silk Road Fund, China-ASEAN Investment Cooperation Fund and China-Africa Development Fund.

13 Including the Asian Infrastructure Investment Bank (AIIB) and BRICS Development Bank.

14 Source: "一帶一路資金支持再盤點", China Merchants Securities, 14 May 2017.

Figure 6. Daily USD/CNH spot rate and volatility (Jan 2014 – Jul 2017)



Source: Bloomberg.

Mainland financial institutions therefore would have an increasing demand for hedging their foreign currency assets against interest rate and exchange rate risks through the use of risk management instruments. While the standardised on-exchange tools like bond futures may not be suitable for their customised needs, they would often go for OTC products like IRS and FX swaps with customised terms to match the payment terms of their assets denominated in foreign currencies[15]. These OTC transactions in foreign currencies undertaken by Mainland financial institutions had been mostly in USD — 21% of China's OTC single currency interest rate derivatives turnover in April 2016 was in USD, compared to 79% in RMB and negligible proportions in Australian dollar (AUD) and euro (EUR)[16].

2. GLOBAL REQUIREMENTS FOR RISK MANAGEMENT OF OTC DERIVATIVES

2.1 Mandatory clearing and margin requirements

The 2008 Global Financial Crisis exposed significant weaknesses in the resiliency of banks and other market participants to financial and economic shocks. In particular, the lack of transparency in the OTC derivatives markets together with the increasing complexity of derivative instruments and their nexus within the financial sector are considered a major systemic risk factor. The absence of regulation and the bilateral nature of OTC derivatives transactions are causes of the market opaqueness. In response, the Group of Twenty (G20)

15 Domestically, available on-exchange tools are the RMB bond futures — 5-Year and 10-Year Treasury Bond Futures — traded on the China Financial Futures Exchange (CFFEX), the only exchange in Mainland China for trading financial derivatives. Mainland domestic banks may also deal in foreign currency bond derivatives on overseas exchanges upon authorisation obtained from the Mainland authorities.

16 Source: BIS Triennial Survey statistics on OTC derivatives (April 2016), BIS website; the percentages are based on daily averages on "net-gross" basis.

initiated a reform programme in 2009 to reduce the systemic risk from OTC derivatives. The reform programme initially comprised the following[17]:

- All standardised OTC derivatives should be traded on exchanges or electronic platforms, where appropriate;
- All standardised OTC derivatives should be **cleared through CCPs**;
- OTC derivatives contracts should be reported to trade repositories;
- **Non-centrally cleared derivatives contracts should be subject to higher capital requirements**.

In 2011, the G20 agreed to **add margin requirements on non-centrally cleared derivatives** to the reform programme. Universal adoption of the G20 margin requirements is expected since, if otherwise, the effectiveness of margin requirements could be undermined (i.e. regulatory arbitrage) and it will not be a level-playing field as financial institutions in the low-margin locations could gain a competitive advantage[18].

One of the key principles is that all financial firms and systemically important non-financial entities that engage in non-centrally cleared derivatives must exchange initial and variation margin as appropriate to the counterparty risks. Initial margin should be exchanged without netting. Such bi-lateral margin would be higher than the initial margin that would be charged by a CCP if these trades are cleared through it. The standardised initial margins required would depend on the asset class, ranging from 1% to 15% of the notional amount of the trade. As required by regulators in the US, Hong Kong and European Union (EU), variation margin requirements would become generally applicable in March 2017. By that date, certain regulated derivatives entities in these regions, including swap dealer in the US and authorised institutions in Hong Kong, are required to collect and post variation margin with covered counterparties.

2.2 Basel III capital requirements

Global financial institutions are now subject to more stringent capital requirements upon the implementation of Basel III[19]. The Basel III framework aims at strengthening the regulation of both capital and liquidity, and to improve the stability and resilience of individual banks and the banking sector as a whole. Banks are required to maintain **a minimum ratio of capital to risk-weighted assets (RWA)**. RWA is calculated by applying a weighting factor (the risk weight) to the asset values, such that "safer" assets are discounted and can therefore be backed by less capital. OTC derivatives are generally considered risky assets and the risk weights would vary according to the type of counterparties. For OTC transactions that are cleared through CCPs which are qualifying (QCCPs[20]), the risk weight could be as low as 2%-4%; otherwise it could be at least 20% on a bilateral basis[21].

[17] Source: "Margin requirements for non-centrally cleared derivatives", Basel Committee on Banking Supervision and Board of the International Organisation of Securities Commissions (IOSCO), BIS, March 2015.

[18] Ditto.

[19] Pursuant to the report "Basel III: A Global Regulatory Framework for More Resilient Banks and Banking Systems" published by the Basel Committee on Banking Supervision in December 2010, worldwide adoption of the Basel III accord is being phased in from 2013 to 2019.

[20] Basel III defines a QCCP as an entity that is licensed to operate as a CCP by the relevant regulator and that is based and prudentially supervised in a jurisdiction where the relevant regulator has implemented domestic rules for financial market infrastructures that are consistent with the Principles for Financial Market Infrastructures by CPMI-IOSCO — The Committee on Payments and Market Infrastructures (CPMI) of the IOSCO.

[21] Reference is made to the "Final Rule" approved by the US Board of Governors of the Federal Reserve System for implementing Basel III.

2.3 Implementation of global requirements in the US, EU and Hong Kong

In the US, the Commodities Futures Trading Commission (CFTC) took a phased-in approach depending on the category of the trading entity, to implement mandatory central clearing of OTC derivatives transactions, initially for certain classes of IRS and CDS from December 2012 to complete by 9 September 2013[22]. "End-user" clearing exception applies only to counterparties that are not financial entities. On 2 July 2013, the Board of Governors of the Federal Reserve System approved a final rule to establish a new comprehensive regulatory capital framework for all US banking organisations to implement the Basel III capital regime (the Basel III US Final Rule).

In the EU, the European Commission adopted new rules in the European Market Infrastructure Regulation (EMIR) in August 2015 to make it mandatory for certain OTC interest rate derivatives transactions to be cleared through CCPs and subsequently in March 2016 to make the same for certain OTC credit derivatives transactions. EMIR's risk mitigation requirements apply to all non-centrally cleared OTC derivatives transactions, which would require the exchange of collateral and bilateral margining. The clearing obligation under Article 4 of EMIR took effect from 21 June 2016 subject to phase-ins that are based on firms' categorisation and derivatives volumes. The clearing obligation applies to contracts between any combination of financial counterparties and non-financial counterparties who exceed the clearing threshold (in terms of gross notional value). The final timeline for all combination of firm categories in OTC transactions to comply with the clearing obligation is 21 December 2018[23].

In Hong Kong, in line with global efforts, the Hong Kong Monetary Authority (HKMA) and the Securities and Futures Commission (SFC), jointly with the Hong Kong Government and stakeholders, have been developing a regulatory regime for the OTC derivatives market in Hong Kong. A series of market consultation has been going on and conclusion actions are and being implemented. Towards establishing an OTC derivatives regulatory regime, the HKMA established the **OTC Derivatives Trade Repository**, which launched its reporting service in July 2013; and the Hong Kong Exchanges and Clearing Limited (HKEX) established the **OTC Clearing Hong Kong Ltd (HKEX OTC Clear)**, which commenced business in November 2013. Phase 1 mandatory central clearing of OTC derivatives transactions commenced in September 2016[24], which covers certain standardised IRS entered into between major dealers.

According to the Basel Committee on Banking Supervision's progress report on adoption of the Basel regulatory framework in April 2017, the US margin requirements for non-centrally cleared derivatives are phased-in beginning on 1 September 2016 and would be fully effective on 1 September 2020. For the EU, the initial margin requirements are being phased in depending on the type of counterparty from 4 February 2017 and the variable margin requirements began to apply from 1 March 2017. For Hong Kong, the margin requirements are in force from 1 March 2017 (subject to a 6-month transitional period).

2.4 Implications to Mainland financial institutions

As a result of the strengthened regulatory requirements discussed above, Mainland financial institutions participating in the OTC derivatives markets, especially when dealing with foreign counterparties, are obliged to follow the overseas mandatory clearing and reporting requirements, and need to take into consideration the cost impacts of non-centrally cleared OTC transactions. Table 2 below summarises the implications.

---

22 "OTC derivatives central clearing in the US", Risk Advisors Inc., February 2013.

23 Source: UK Financial Conduct Authority website (https://www.fca.org.uk).

24 Applicable in effect to in-scope transactions entered into on or after 1 July 2017.

Table 2. Implications of global requirements on OTC derivatives transactions		
Regulatory requirement	**Global basis**	**Implications**
Capital ratio to risk-weighted assets	Basel III	• Bilateral OTC derivatives transactions would have a much higher risk weight than CCP derivatives transactions, implying a higher pricing of non-centrally-cleared OTC contracts to the Mainland counterparty[25].
Mandatory central clearing	G20	• Financial institutions trading with counterparties in jurisdictions that require mandatory central clearing of their OTC derivatives trades are obliged to follow suit; otherwise, they would not be able to trade with these counterparties. • Utilising clearing houses recognised by the home regulator of the overseas counterparties will need to establish connectivity, e.g. via a clearing broker. This may be costly as the clearing broker will charge a commission fee in addition to the clearing fee that is charged by the CCP.
Margining for non-centrally cleared derivatives	G20	• Initial margin and variation margin, on a non-netting basis, will be required for bilateral OTC derivatives trades with foreign counterparties where the jurisdiction follows the G20 requirements, which implies high funding and operating costs than central clearing. • In bilateral clearing, as there are still uncertainties in PRC being a netting jurisdiction[26], Mainland banks would face challenges in executing ISDA collateral agreement[27] with foreign counterparties and therefore may not be accepted by foreign institutions as counterparties in executing OTC derivatives transactions, or even being accepted, may be charged higher margin requirements[28].

In conclusion, under the latest global regulatory requirements for OTC derivatives, **Mainland financial institutions dealing with foreign counterparties in OTC derivatives would be subject to high costs for not using central clearing services for their transactions**. Moreover, the multilateral netting process in central clearing would substantially reduce the margin requirements to a level much lower than the total margins required in the case of bilateral clearing with multiple counterparties. **It would therefore be more preferable for Mainland financial institutions to opt for central clearing of their increasing OTC derivatives transactions with foreign counterparties. The key consideration for the Mainland financial institutions is the practical choice of a relatively low cost central clearer.**

3. OTC CLEARING SERVICES FOR MAINLAND BANKS

Mainland banks which execute OTC derivatives transactions with foreign counterparties may be obliged to adopt the practice of the foreign counterparties to centrally clear the transactions

[25] The counterparty will price-in the capital charge when quoting the price to the Mainland bank. The Mainland bank would therefore be subject to a higher pricing, especially when there is no International Swaps and Derivatives Association (ISDA) collateral agreement in place for credit risk protection for the transaction.

[26] The status as a "netting jurisdiction" provides for the enforceability of close-out netting for OTC derivative transactions under the ISDA master agreement in case of bankruptcy of a counterparty. (See "China — The New Netting Jurisdiction", Derivatives Week, Vol. XXIII, No.5, 10 February 2014, and "ISDA publishes updated memoranda on China close-out netting", King&Wood Mallesons, 3 April 2017.

[27] This refers to the Credit Support Annex (CSA) of the ISDA Master Agreement, which defines the terms or rules under which collateral is posted or transferred between swap counterparties to mitigate the credit risk arising from "in-the-money" derivative positions.

[28] To clarify on the enforceability of close-out netting provisions under master derivative agreements with Mainland financial institutions, the China Banking Regulatory Commission (CBRC) issued a reply document dated 4 July 2017 in response to related questions to the Financial and Economic Affairs Committee of the National People's Congress. The reply document states that China's Enterprise Bankruptcy Law in principle does not conflict with the close-out netting provisions of ISDA's related regulations (the Master Agreement) and yet the PRC judiciary ultimately has the power to determine the validity of close-out netting provisions.

via an international clearing house. Prominent ones in the developed markets include LCH and Eurex Clearing (a company of Deutsche Börse AG) in Europe and CME Clearing in the US. Compared to these clearing houses in the western markets, the OTC clearing arm of HKEX in Hong Kong — HKEX OTC Clear — may offer a preferable alternative.

3.1 LCH[29]

LCH operates a number of clearing arms under LCH.Clearnet Ltd for OTC derivatives clearing — among others, **SwapClear** for IRS and **ForexClear** for FX derivatives which the Mainland banks would be active in.

SwapClear services cover different swap classes (IRS / zero coupon / basis / inflation / FRA), indexes (overnight index swaps (OIS)) and maturities (variable notional swaps). In 2017 up to 28 July, the notional value of OTC transactions cleared by SwapClear amounted to US$526.44 trillion, of which 54% was in USD; and US$122.69 trillion was client clearing, of which 62% was in USD. During the same period, 29% of total cleared volume in notional terms was in IRS (i.e. US$154.28 trillion, of which US$58.69 trillion or 38% was in USD); 30% of client clearing volume in notional terms was in IRS (i.e. US$37.04 trillion, of which 46% was in USD). According to SwapClear, it clears more than 50% of all OTC IRSs and more than 95% of the overall cleared OTC IRS market in the world.

ForexClear serves the non-deliverable currency forwards (NDF) market, covering currency pairs of USD against 12 currencies as of the end of July 2017, including Chinese yuan (CNY). In November 2013, client clearing was launched on ForexClear, allowing clients to access through Futures Commission Merchants (FCMs)[30]. In 2017 up to 22 July 2017, the total volume cleared by ForexClear amounted to US$5.45 trillion, of which 13% (US$712 billion) was in USD/CNY.

OTC transactions must be submitted to LCH for clearing by SwapClear or ForexClear via an Approved Trade Source System (e.g. Bloomberg, MarkitWire) as defined in the LCH rulebook. Membership of SwapClear consists of two types — SwapClear Clearing Members (SCMs) and FCM Clearing Members (FCMs). SCMs are direct Clearing Members that can clear proprietary business and non-US domiciled client business. FCMs are direct Clearing Members that can clear proprietary business, US domiciled client business and non-US domiciled client business. As for ForexClear, participants include FX Clearing Members (FXCCMs), FCM Clearing Members, dealers or clients. Dealers register trades in ForexClear via a clearing agreement with an FXCCM. A client can clear through a FXCCM or FCM.

Applicants for membership of LCH.Clearnet need to satisfy a full range of requirements including minimum net capital requirements and operational requirements such as proper system setups, and certain additional criteria for clearing OTC trades in SwapClear or ForexClear. If the applicant is a bank, it must at all times be appropriately authorised by the banking supervisors of its home country and additionally meet any notification or authorisation requirements set by banking supervisors in the UK.

LCH meets the Basel III criteria of a QCCP in a number of regulatory regimes, including the US, the EU and Hong Kong. In other words, OTC derivatives exposure of banks using LCH's central clearing service would subject to lower capital charges.

Becoming a clearing member of LCH would probably not practical for Mainland banks since the PRC may not be accepted as a netting jurisdiction (see Table 2 and associated footnotes).

29 Relevant data and information are obtained from the LCH website (http://www.lch.com).

30 A FCM is an entity that solicits or accepts orders to buy or sell futures contracts, options on futures, retail off-exchange forex contracts or swaps, and accepts money or other assets from customers to support such orders.

In the usual case, Mainland banks which use LCH service for clearing their cross-border OTC transactions would have to select the Clearing Member of SwapClear or ForexClear as the case may be to be their clearing agent. Legal documents such as a Client Clearing Agreement and a Security Deed[31] with the clearing member that are in compliance with the related rules and regulations governing the clearer would be required. SwapClear charges booking fee and maintenance fee for client clearing, on a per-million notional basis. Blended rate and multilateral compression fee schedule are applied to compression service, which enables market participants to reduce the overall notional and number of line items in their portfolios by netting trades. ForexClear charges a per-million notional fee for client clearing and client compression fee is also chargeable for using compression service.

3.2 CME Group OTC Clearing[32]

In the IRS market, CME Group OTC Clearing (CME OTC Clear) covers similar product types as the LCH's SwapClear (fixed/float swaps, OIS, basis swaps, FRAs, etc.) in 21 currencies. In the FX derivatives market, it covers NDFs in 12 currencies including CNY, and cash-settled forwards (CSFs). In the first half of 2017, it had a total clearing volume of US$16.38 trillion in IRS and US$21 million in FX derivatives.

OTC clearing members that will clear OTC derivatives for customers must be registered with the US CFTC as a FCM. OTC clearing members that are incorporated/domiciled in non-US jurisdictions must be subject to a legal and insolvency regime acceptable to the clearing house.

The clearing arms of CME Group — CME Clearing and CME Clearing Europe — meet the criteria established for a QCCP at its US and European clearing houses respectively, covering the OTC derivatives products. Additionally, the operating company of CME Clearing received recognition from the European Securities and Markets Authority (ESMA) to qualify as a QCCP. Therefore, European clients are able to treat CME Clearing as a QCCP.

Similar to the case of clearing at LCH, Mainland banks that clear through CME OTC Clear has to select a clearing firm at CME OTC Clear and complete a Futures Account Agreement with a Cleared OTC Derivatives Addendum. Clearing fee and maintenance fee are applicable on a per-million notional basis. Multilateral compression service is available at a fee.

3.3 Eurex Clearing[33]

Eurex Clearing's OTC clearing services (EurexOTC Clear) covers IRS, basis swaps, OIS, zero coupon inflation and FRAs. In December 2016, Eurex Clearing announced that EurexOTC Clear planned to introduce the clearing of OTC FX swaps, OTC FX spots and OTC FX forwards in currency pairs EUR/USD and GBP/USD. In the first half of 2017, a total notional value of €739,625 million (~US$845 billion) in IRS was cleared at EurexOTC Clear.

There are three types of membership at Eurex Clearing for OTC clearing — General Clearing Member (GCM) which can clear their own business and those of all clients; Direct Clearing Member (DCM) who can clear their own business; Basic Clearing Member (BCM) which combines elements of direct clearing membership and traditional service relationship in client clearing. BCMs have principal relationship with the CCP, but require the support of a Clearing Agent for client clearing. GCMs can act as Clearing Agents. Clients in OTC clearing must be

[31] A Security Deed is required by the clearing house where no exempt client clearing rule is available for the jurisdiction in question. This acts as a form of protective mechanism that entitles the clearing house to deal with the client assets in case the clearing member defaults, for protection of the client's interests.

[32] Relevant data and information are obtained from the CME Group website (http://www.cmegroup.com/clearing.html).

[33] Relevant data and information are obtained from the Eurex Clearing website (http://www.eurexclearing.com/clearing-en/).

disclosed and known to Eurex Clearing as Registered Customers and as such need to enter a tripartite agreement with Eurex Clearing and their Clearing Member.

Eurex Clearing received a conditional registration from the US CFTC as a derivatives clearing organisation under the Commodity Exchange Act, which will become effective after Eurex Clearing meets CFTC's "straight-through processing" requirements. In this situation, Eurex Clearing may clear proprietary positions in IRS for US clearing members but not yet for FCM customer positions[34].

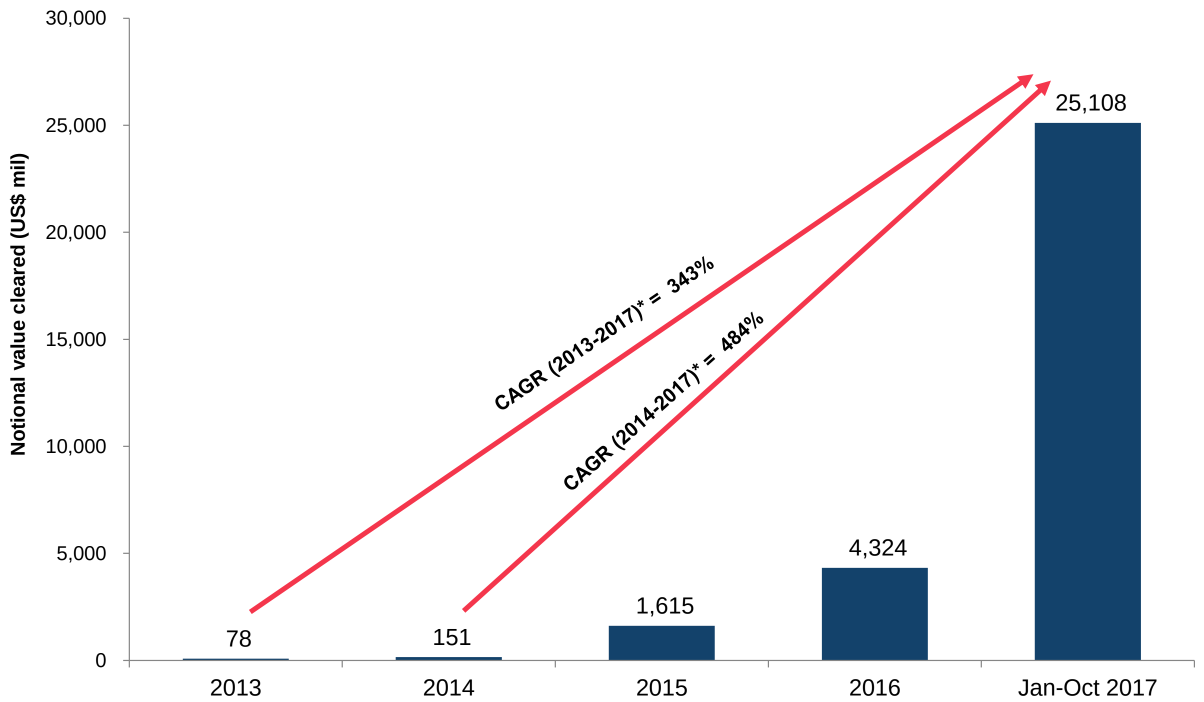
Applicable fees include booking fee, maintenance fee, other administrative charges and fees for additional services like trade netting or multilateral compression.

3.4 HKEX OTC Clear[35]

HKEX OTC Clear was established in 2013 in response to G20's reform programme in 2009, to provide clearing services for OTC derivatives as a CCP. It commenced business on 25 November 2013 after being recognised by the SFC as Recognised Clearing House and was designated by the SFC in August 2016 as a CCP for mandatory clearing for OTC derivatives transactions specified under the Hong Kong OTC derivatives regulatory regime. Client clearing service was subsequently launched in March 2017.

Both proprietary clearing and client clearing services are offered for IRS, basis swaps, cross-currency swaps (CCS), non-deliverable IRS (NDIRS) and NDFs (see Appendix 1 for the list of products covered). The clearing volume in notional terms experienced a CAGR of 343% since launch to 2017 and an even higher CAGR of 484% since the full-year operation in 2014 (see Figure 7).

Figure 7. Notional clearing value at HKEX OTC Clear (2013 – Oct 2017)



Note: CAGR is calculated using the 12-month pro-rata figure of 2017 based on Jan-Oct 2017 figure.
Source: HKEX.

[34] Source: CFTC Release pr7316-16, 1 February 2016.

[35] Source: HKEX.

HKEX OTC Clear accepts Clearing Members which are either Authorised Institutions (AIs) licensed by the HKMA or corporations licensed by the SFC (Licensed Corporations). The OTC clearing and settlement system accepts OTC derivatives transactions from two Approved Trade Registration Systems (ATRS) — MarkitWire, and DSMatch.

In April 2015, HKEX OTC Clear was recognised as a "Third Country CCP" by the ESMA in Europe for OTC derivatives clearing. In September 2015, it received a prescribed CCP status facility under Australia's mandatory clearing regime by the Australia Securities and Investments Commission. In December 2015, it obtained exemption from the US CFTC, allowing it to offer clearing services to US persons for their proprietary transactions without being registered as a Derivatives Clearing Organisation. With these international recognised OTC CCP clearing statuses, HKEX OTC Clear is well positioned to offer central clearing services for Mainland banks' OTC transactions in USD, EUR and RMB with foreign counterparties. The product coverage would be expanded to cover deliverable FX currency forwards and swaps, and FX options in the future, subject to regulatory approval. Trade compression service is also scheduled to be launched in late 2017 to cater for customer needs.

Applicable fees for client clearing services include registration fee and maintenance fee for IRS and registration fee for NDF, in addition to other fees charged on services used by the Clearing Member.

3.5 A choice for Mainland banks

HKEX OTC Clear is the only Recognised Clearing House for OTC derivatives in Hong Kong and is also a QCCP for US and European clients. It operates in the Asian time zone in the Asian international financial centre, Hong Kong, in which the major Mainland banks have set up branches and have been in business operations for years. Moreover, Hong Kong is a major trading market in OTC FX and interest rate instruments in the world[36] and also a prominent offshore RMB centre[37].

In Hong Kong, the HKMA's SWIFT-based ***RMB Real Time Gross Settlement (RTGS) system*** facilitates market participants from all over the world to handle RMB transactions both with Mainland China and among the offshore markets. The RMB RTGS system has Bank of China (Hong Kong) Limited as its Clearing Bank, which maintains a settlement account with the PBOC and is a member of the China National Advanced Payment System (CNAPS). The RMB RTGS system in Hong Kong is directly linked up with CNAPS and can be regarded as a technical extension of CNAPS in Mainland China, but governed by Hong Kong laws. There are also inter-linkages between RMB, HKD, USD and euro RTGS systems in Hong Kong, enabling payment-versus-payment (PvP) settlement to improve settlement efficiency and to eliminate settlement risk arising from time lags in transactions or time-zone differences. Statistics from SWIFT show that the value of RMB settlement handled by banks in Hong Kong accounted for some 70% of the total offshore RMB payments conducted vis-à-vis Mainland China and within the offshore market globally[38].

[36] Hong Kong ranked 4th in the turnover of OTC FX instruments and 3rd in the turnover of OTC single currency interest rate derivatives in the world. Source: BIS Triennial Survey statistics on OTC derivatives (April 2016), BIS website; daily averages are on "net-gross" basis.

[37] Total RMB deposits in Hong Kong was RMB 534.73 billion as at the end-July 2017 (source: HKMA website), compared to RMB 138 billion as of end-June 2017 for Singapore (preliminary data, source: Monetary Authority of Singapore website), GBP 9 billion (~RMB 77 billion) as of end-March 2017 for the UK (source: Bank of England website) and RMB 307.8 billion as of end-April 2017 for Taiwan (source: Offshore RMB Express No. 6, 2017, Bank of China (Hong Kong)).

[38] Quoted in HKMA's "Hong Kong — The Global Offshore Renminbi Business Hub", January 2016.

In view of the progress of RMB internationalisation, offshore RMB derivatives trading is believed to have a high growth potential for the purpose of RMB risk management[39]. In this respect, the participation from Mainland institutions is believed to increase, offering RMB liquidity to meet the demand from global institutions for their increasing RMB assets. With access to the RMB RTGS payment system in Hong Kong, HKEX OTC Clear is able to support Mainland and global financial institutions' OTC transactions in offshore RMB[40], in addition to serving OTC transactions in USD and other major currencies. On the contrary, overseas clearing houses using FX settlement services offered by overseas platforms like CLS would not be able to offer RMB settlement services[41].

With the strategic position of being an OTC clearing house in the Asian region serving Mainland market participants, shareholders of HKEX OTC Clear include five Mainland financial institutions — Agricultural Bank of China Ltd, Bank of China (Hong Kong) Ltd, Bank of Communications Co., Ltd Hong Kong Branch, CCB International Securities Ltd and the Industrial and Commercial Bank of China (Asia) Ltd.

Mainland-incorporated banks' Hong Kong subsidiaries which are AIs or Licensed Corporations can become members of HKEX OTC Clear upon satisfying the membership requirements. Given the extensive business operations of Mainland banks in Hong Kong, this would be relatively more cost-effective than the direct application of Mainland-incorporated banks for membership in the US or Europe clearing houses. For Mainland banks which are not members of major clearing houses of LCH in Europe or the CME Group in the US, client clearing through a clearing broker will be needed in executing OTC derivatives transactions with foreign parties. This would be more costly due to higher transaction fee and commission fee to pay to the clearing broker to compensate for netting and capital cost, and would also be subject to the default risk of the clearing broker. Besides, the issues about operational efficiency and hitches for client clearing via a clearing agent may also be concerns to the Mainland banks. These would include the long onboarding process in engaging a clearing agent whenever the need arises, the dependence on the system infrastructure of the clearing agent and the dependence on the agent's gaining approval for acceptance by the CCP for central clearing of the transaction.

Moreover, HKEX OTC Clear has developed a special solution for admitting Mainland-incorporated licensed banks to be its Clearing Members, within the governance of the Hong Kong regulatory framework. This practice and the resultant clearing solution for Mainland banks are unparalleled in the US and European clearing houses due to the uncertainty in the status of the PRC as a netting jurisdiction. Details are presented in Section 4 below.

4. HKEX OTC CLEAR'S SOLUTION FOR MAINLAND BANKS

4.1 PRC Clearing Members

PRC-incorporated banks with a Hong Kong branch who are Authorized Institutions regulated by HKMA can be admitted as direct clearing member (referred to as "PRC Clearing Members") of HKEX OTC Clear.

Since HKEX OTC Clear has obtained legal opinions confirming the enforceability of its clearing rules under Hong Kong and PRC law (including provisions relating to close out and

[39] See also the HKEX research report, "HKEX towards an offshore RMB product trading and risk management centre", April 2017, on the HKEX website.

[40] Hong Kong Interbank Clearing Ltd (HKICL), the operator of the payment systems, has a total of 141 local RMB clearing members and 68 overseas RMB clearing members as of 25 September 2017 (source: HKMA website).

[41] CLS currently provides FX settlement services covering 18 sovereign currencies through accounts established with each of the central banks of the respective currencies. These do not include the RMB and the PBOC. (Source: CLS website.)

set off), it is able to margin PRC Clearing Members on the basis of their net exposure across their entire cleared portfolio. In addition, HKEX OTC Clear enjoys finality protection for payments made in respect of cleared contracts and actions taken against PRC Clearing Members under the default provisions of its clearing rules under Hong Kong law (which is the law governing the clearing rules and collateral posted by PRC Clearing Members and held by HKEX OTC Clear).[42]

Currently, four PRC-incorporated banks — Agricultural Bank of China Ltd, Bank of Communications Co., Ltd, China Minsheng Banking Corporation, Ltd and Shanghai Pudong Development Bank Co., Ltd, have been admitted as direct Clearing Members of HKEX OTC Clear via their Hong Kong branches. Direct members also include the Hong Kong subsidiaries of three other PRC-incorporated banks. (See Appendix 2 for the Clearing Members of HKEX OTC Clear.)

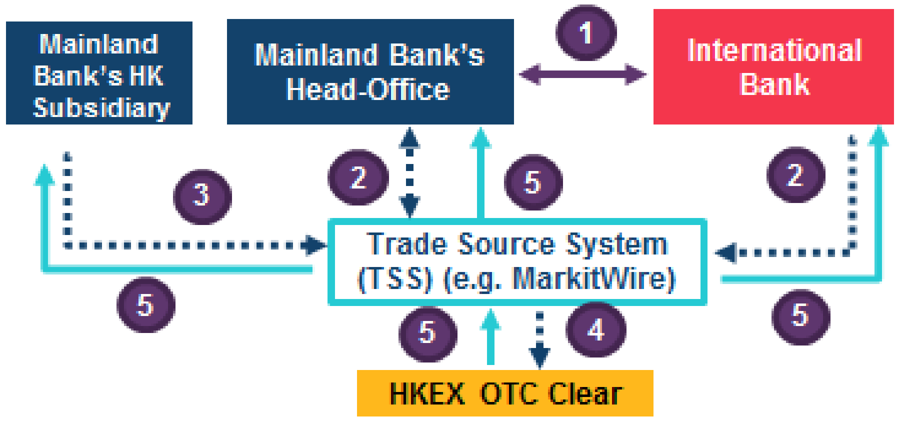
4.2 Clearing models for cross-border clearing with international counterparties

With direct membership, Mainland banks are able to conduct direct clearing with HKEX OTC Clear without the need to use a clearing broker, thereby avoiding the default risk of the clearing broker and saving commission costs and transaction fees. Direct clearing may be done through the Mainland bank's Hong Kong subsidiary which is a Clearing Member of HKEX OTC Clear, or through its Hong Kong branch if itself is a Clearing Member of HKEX OTC Clear via its Hong Kong branch. The respective operations are illustrated in Figures 8 and 9 below.

[42] Source: HKEX.

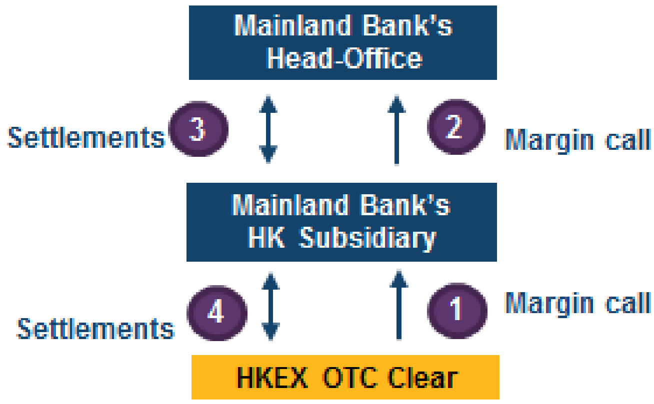
Figure 8. Operating model for clearing via the Mainland bank's Hong Kong subsidiary

(a) Trade registration



1. Bi-lateral trades done between Mainland Bank's Head-Office and International Bank.
2. Clearing request submitted by both the Mainland Bank's Head-Office (act as a client) and International Bank via TSS.
3. Mainland Bank's HK Subsidiary (act as clearing broker) checks the credit limits before accepting the request.
4. Once accepted, TSS sends the matched record to HKEX OTC Clear for product, margin and credit checks.
5. After the trade is accepted by registration, HKEX OTC Clear will inform Mainland Bank's HK Subsidiary, Mainland Bank's Head-Office and International Bank about the trade clearing status through TSS, and trade will be novated:
   - HKEX OTC Clear vs International Bank
   - HKEX OTC Clear vs Clearing Mainland Bank's HK Subsidiary
   - Mainland Bank's HK Subsidiary vs Mainland Bank's Head-Office

(b) Margin settlement and collateral management

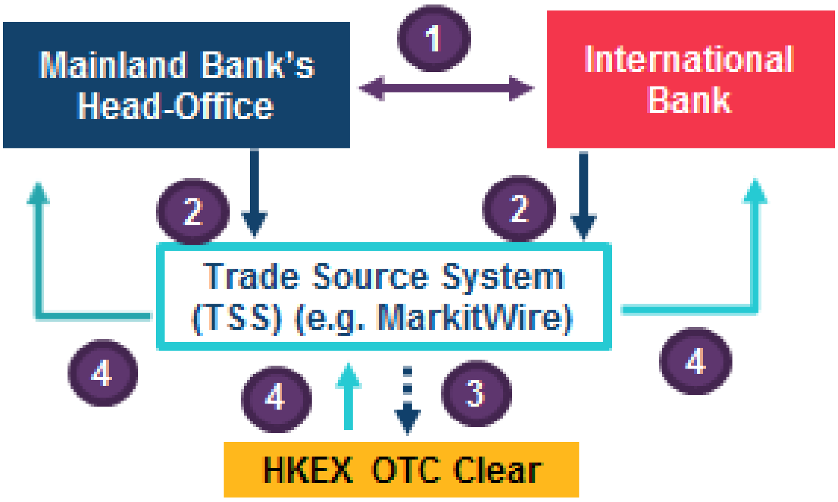


1. HKEX OTC Clear will issue initial margin and variation margin call to the Mainland Bank's HK Subsidiary.
2. Mainland Bank's HK Subsidiary will inform Mainland Bank's Head-Office for the relevant initial and variation margin required by HKEX OTC Clear.
3. Mainland Bank's Head-Office will settle the initial margin and variation margin to Mainland Bank's HK Subsidiary.
4. Mainland Bank's HK Subsidiary will then settle the initial margin and variation margin of Mainland Bank's Head-Office to HKEX OTC Clear.

Source: HKEX OTC Clear.

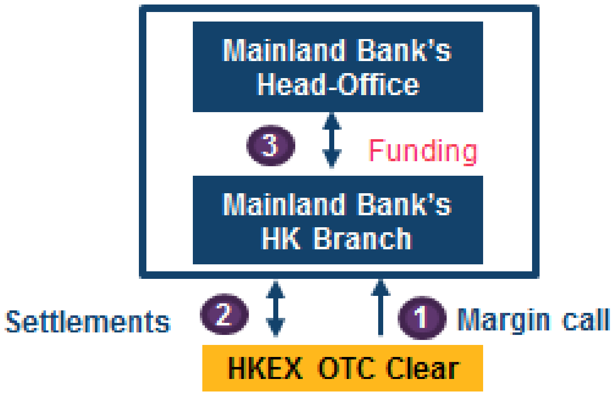
Figure 9. Operating model for clearing via the Mainland bank's Hong Kong branch

(a) Trade registration



1. Bi-lateral trades done between Mainland Bank's Head-Office and International Bank.
2. Clearing request submitted by Mainland Bank's Head-Office and International Bank via TSS.
3. Once accepted, TSS sends the matched record to HKEX OTC Clear for product, margin and credit checks.
4. After the trade is accepted by registration, HKEX OTC Clear will inform Mainland Bank's HK Branch, Mainland Bank's Head-Office and International Bank about the trade clearing status through TSS, and trade will be novated:
   - HKEX OTC Clear vs International Bank
   - HKEX OTC Clear vs Mainland Bank's Head-Office (under membership of Mainland Bank via its HK Branch)

(b) Margin settlement and collateral management



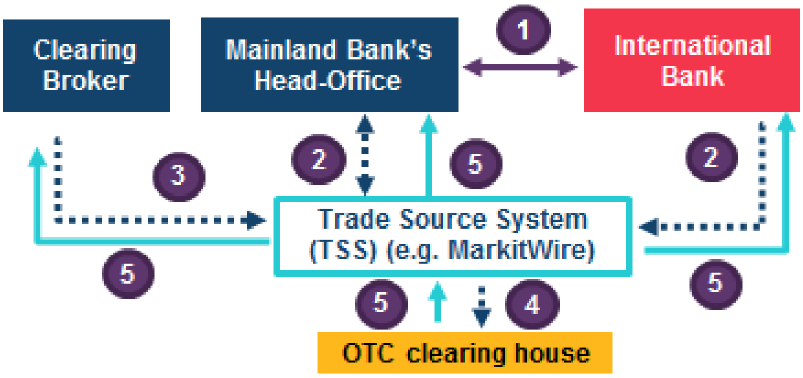
1. HKEX OTC Clear will issue initial margin and variation margin call to the Mainland Bank's HK Branch. The initial and variation margin will be calculated based on all trades cleared by Head-Office and HK Branch.
2. Mainland Bank's HK Branch settles the initial margin and variation margin to HKEX OTC Clear.
3. Internal funding arrangement is required between Mainland Bank's Head-Office and its HK Branch.

Source: HKEX OTC Clear.

The above clearing models would provide a more convenient solution and at lower costs than the model for clearing through a clearing broker, as illustrated in Figure 10.

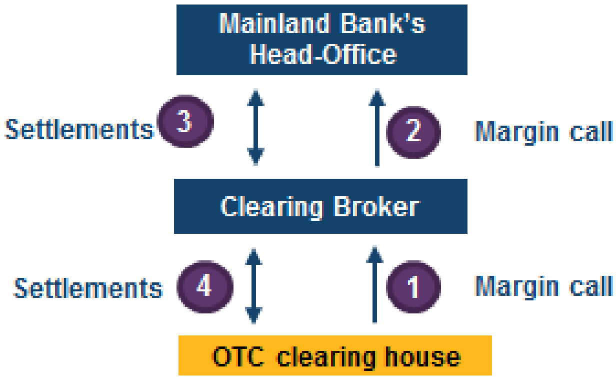
Figure 10. Operating model for clearing by Mainland banks via a clearing broker at LCH

(a) Trade registration



1. Bi-lateral trades done between Mainland Bank's Head-Office and international bank.
2. Clearing request submitted by both the Mainland Bank's Head-Office (act as a client) and International Bank via TSS.
3. Clearing Broker checks the credit limits before accepting the request.
4. Once accepted, TSS sends the matched record to OTC clearing house for product, margin and credit checks.
5. After the trade is accepted by registration, OTC clearing house will inform Clearing Broker, Mainland Bank's Head-Office and International Bank about the trade clearing status through TSS, and trade will be novated:
   - OTC clearing house vs International Bank
   - OTC clearing house vs Clearing Broker
   - Clearing Broker vs Mainland Bank's Head-Office

(b) Margin settlement and collateral management



1. OTC clearing house will issue initial margin and variation margin call to the Clearing Broker.
2. Clearing Broker will issue statement to Mainland Bank's Head-Office for the relevant initial and variation margin required by OTC clearing house.
3. Mainland Bank's Head-Office will settle the initial margin and variation margin to Clearing Broker.
4. Clearing Broker will then settle the initial margin and variation margin of Mainland Bank's Head-Office to OTC clearing house.

Source: HKEX OTC Clear.

4.3 Comparative advantages vis-à-vis other CCPs

As an alternative to indirect clearing through clearing brokers at clearing houses in the US and Europe, the comparative advantages for Mainland banks to do direct clearing with HKEX OTC Clear would include time zone convenience, lower risk exposure and lower costs (see Table 3).

Table 3. Brief comparison of HKEX OTC Clear with other major OTC clearing houses

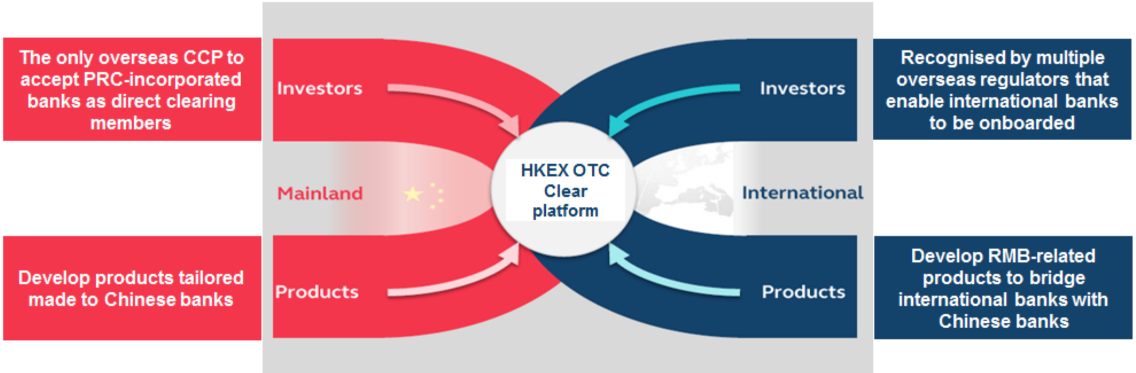
Attribute	HKEX OTC Clear	CME OTC Clear	LCH (SwapClear/ForexClear)	EurexOTC Clear
Service hours	HK time 08:30 – 19:00 07:30 – 23:00 (Web Portal)	23 hours and 45 minutes per day	SwapClear 07:30 – 24:00 (GMT) 14:30 – 07:00 (HK time) ForexClear 24 hours weekdays 20:00 (GMT) Sunday – 01:00 (GMT) Saturday	8:00 – 22:00 CET
Diversity of membership	EU, US, PRC, HK and other Asian banks	Mainly international banks		
Product coverage	Various types of IRS and NDF	Various types of IRS, NDF, CSF	Various types of IRS, NDF	Various types of IRS
Currency coverage	EUR, USD, RMB and other Asian currencies	Major international currencies		
Membership for Mainland banks	• Direct membership of HK subsidiary • Direct membership of Mainland-incorporated bank via HK branch	The bank (not the branch) may apply for direct membership if satisfying additional regulatory requirements of the jurisdiction		
Clearing mode for Mainland banks	Direct clearing via the Hong Kong subsidiary which is a clearing member; or via its Hong Kong branch if itself is a clearing member via its HK branch	Indirect clearing via a Clearing Broker (another international bank)		
Risk	Lower risk as direct clearing is done via intra-group entities	Subject to default risk of Clearing Broker		
Cost	Lower transaction cost and no commission fee	Higher transaction fee and commission fee for using Clearing Broker to compensate for netting and capital cost		

Note: GMT — Greenwich Mean Time; CET — Central European Time

Source: HKEX OTC Clear, websites of the respective clearing houses.

Operating in Hong Kong which is a financial hub for Mainland and international users and an offshore RMB centre, HKEX OTC Clear provides a platform for connecting Mainland banks with their international counterparts in clearing their OTC derivatives transactions in both global currencies and RMB. This is as illustrated in Figure 11.

Figure 11. The connectivity platform of HKEX OTC Clear for Mainland and international banks



5. CONCLUSION

Given the increasing exposure to interest rate risk in foreign currencies and FX risk due to increasing foreign assets held by Mainland financial institutions in USD and other foreign currencies, there is an increasing demand for them to engage in cross-border OTC transactions with foreign counterparties in risk management instruments like IRS and FX derivatives in foreign currencies for hedging their exposure.

Under the tightened global regulatory framework for risk management of OTC derivatives after the 2008 Global Financial Crisis, financial institutions would either have to do mandatory central clearing for standardised OTC derivatives or to be subject to higher capital and margin requirements for bilaterally cleared OTC derivatives. In the latter case, they may voluntarily opt for central clearing in order to reduce the transaction costs.

Unparalleled in the US and European clearing houses, HKEX OTC Clear accepts PRC-incorporated Mainland banks as direct clearing members via their Hong Kong branches so that the Mainland banks can do direct clearing via their Hong Kong branches. In this way, HKEX OTC Clear offers a more convenient and cost-effective solution to Mainland banks for central clearing of their OTC derivatives transactions.

Moreover, there is likely a high growth potential in offshore RMB derivatives trading for RMB risk management in the course of RMB internationalisation. Compared to its overseas counterparts, HKEX OTC Clear is more capable to support Mainland and global financial institutions' OTC transactions in offshore RMB, in addition to serving OTC transactions in USD and other major currencies.

APPENDIX 1. PRODUCTS SERVED BY HKEX OTC CLEAR

Product	Currency	Maximum residual term
Single currency interest rate swap (IRS)	CNH (offshore Renminbi)	10 years
	USD	
	EUR	
	HKD	
Single currency basis swap	USD	10 years
	EUR	
	HKD	
Non-deliverable IRS	CNY (onshore Renminbi)	5 years
	INR (Indian Rupee)	10 years
	MYR (Malaysian Ringgit)	
	KRW (Korean Won)	
	THB (Thai Baht)	
	TWD (New Taiwan Dollar)	
Cross currency swap (CCS)	USD vs CNH (offshore Renminbi)	10 years
Non-deliverable currency forward (NDF)	USD / CNY (onshore Renminbi)	2 years
	USD / INR (Indian Rupee)	
	USD / KRW (Korean Won)	
	USD / TWD (New Taiwan Dollar)	

APPENDIX 2. CLEARING MEMBERS OF HKEX OTC CLEAR (AS OF SEPTEMBER 2017)

Hong Kong
1. The Bank of East Asia, Limited
2. Hang Seng Bank, Limited
3. The Hongkong and Shanghai Banking Corporation Limited
Mainland
4. Agricultural Bank of China Limited
5. Bank of China (Hong Kong) Limited
6. Bank of Communications Co., Ltd
7. CCB International Securities Limited
8. China Minsheng Banking Corporation, Ltd
9. Industrial and Commercial Bank of China (Asia) Limited
10. Shanghai Pudong Development Bank Co., Ltd
Europe
11. BNP Paribas
12. Deutsche Bank Aktiengesellschaft
13. Standard Chartered Bank
US
14. Citibank N.A.
15. JP Morgan Bank, National Association
Asia Pacific
16. DBS Bank Ltd.
17. Australia and New Zealand Banking Group Limited (ANZ)

ACRONYMS

AI	Authorised Institutions in Hong Kong
BIS	Bank for International Settlements
CCDC	China Central Depository & Clearing Co., Ltd
CCP	Central counterparty
CDS	Credit default swap
CFETS	China Foreign Exchange Trade System
CFTC	Commodity Futures Trading Commission in the US
CNAPS	China National Advanced Payment System
CRM	Credit risk mitigation
CRMW	Credit risk mitigation warrant
CSF	Cash-settled forward
EMIR	European Market Infrastructure Regulation
ESMA	European Securities and Markets Authority
EU	European Union
FRA	Forward rate agreement
FX	Foreign exchange
IRS	Interest rate swap
ISDA	International Swaps and Derivatives Association
NDF	Non-deliverable currency forwards
OIS	Overnight index swap
OTC	Over-the-counter
PBOC	People's Bank of China
QCCP	Qualified central counterparty
QFII	Qualified Foreign Institutional Investor
RQFII	Renminbi Qualified Foreign Institutional Investor
RTGS	Real time gross settlement
SAFE	State Administration of Foreign Exchange in China
SCH	Shanghai Clearing House
SFC	Securities and Futures Commission in Hong Kong
SHIBOR	Shanghai Interbank Offered Rate